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**ABSTRACT**

A Group TDMA multiple destination, multiple node wireless network includes a first destination having a first group of nodes (Group 1) in communication range and a  
10 second destination having a second group of nodes (Group 2) in communication range. A third group of nodes (Group 3) are within communication range of both first and second destinations. Each group of nodes is assigned a periodically recurring set of time slots for transmitting to a designated destination. A network processor is programmed for (a)  
15 dividing the frame into a number of fixed-length time slots; (b) assigning a fraction  $1-x$  of the time slots to the first and second groups of nodes; (c) assigning a fraction  $x$  of the time slots to the third group; (d) subdividing the third group into a fourth group of nodes and a fifth group of nodes; (e) assigning a fraction  $y$  of the fraction  $x$  time slots to the fourth group for transmission to the first destination and a fraction  $1-y$  of the fraction  $x$  time slots to the fifth group for transmission to the second destination; (f) applying a multiple-access  
20 protocol to each group in its assigned set of time slots; and (g) optimizing the values of  $x$  and  $y$  in order to realize the maximum possible value of stable throughput rate  $\lambda^*$ . Group TDMA provides increased throughput capacity as it provides a balance between scheduled access and pure random access. Nodes may be grouped according to geographical  
25 location as well as arbitrary criteria, such as priority or node mission.